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SEQUENCE LISTING

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<120> METHODS FOR MAKING AND USING FATTY ACID
SYNTHESIS PATHWAY REAGENTS

<130> GM50068

<140> TO BE ASSIGNED

<141> 2002-03-25

<150> PCT/US00/29451

<151> 2000-10-26

<150> 60/161,775

<151> 1999-10-27

<160> 37

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 999

<212> DNA

<213> Staphylococcus aureus

<400> 1

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ttaatggcgc aagcatttcc tactggtgta ggaagcatgg ctgcagtatt gggatttagat 480

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gcaaacatta attgcccagg tcaaattgtt gttcaggc acaaagctt aattgatgag 600
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gacaaagaag taattaaatc taatatggtc aagcaattat attcaccagt acaattcatt 840
aactcaacag aatggctaat agaccaaggt gttgatcatt ttattgaaat tggcctgga 900
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<210> 2

<211> 332

<212> PRT

<213> Staphylococcus aureus

<400> 2

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20 25 30

Pro Gly Gln Gly Ala Gln Lys Val Gly Met Ala Gln Asp Leu Phe Asn
35 40 45

Asn Asn Asp Gln Ala Thr Glu Ile Leu Thr Ser Ala Ala Lys Thr Leu
50 55 60

Asp Phe Asp Ile Leu Glu Thr Met Phe Thr Asp Glu Glu Gly Lys Leu
65 70 75 80

Gly Glu Thr Glu Asn Thr Gln Pro Ala Leu Leu Thr His Ser Ser Ala
85 90 95

Leu Leu Ala Ala Leu Lys Ile Leu Asn Pro Asp Phe Thr Met Gly His
100 105 110

Ser Leu Gly Glu Tyr Ser Ser Leu Val Ala Ala Asp Val Leu Ser Phe
115 120 125

Glu Asp Ala Val Lys Ile Val Arg Lys Arg Gly Gln Leu Met Ala Gln
130 135 140

Ala Phe Pro Thr Gly Val Gly Ser Met Ala Ala Val Leu Gly Leu Asp
145 150 155 160

Phe Asp Lys Val Asp Glu Ile Cys Lys Ser Leu Ser Ser Asp Asp Lys
165 170 175

Ile Ile Glu Pro Ala Asn Ile Asn Cys Pro Gly Gln Ile Val Val Ser
180 185 190

Gly His Lys Ala Leu Ile Asp Glu Leu Val Glu Lys Gly Lys Ser Leu
195 200 205
Gly Ala Lys Arg Val Met Pro Leu Ala Val Ser Gly Pro Phe His Ser
210 215 220
Ser Leu Met Lys Val Ile Glu Glu Asp Phe Ser Ser Tyr Ile Asn Gln
225 230 235 240
Phe Glu Trp Arg Asp Ala Lys Phe Pro Val Val Gln Asn Val Asn Ala
245 250 255
Gln Gly Glu Thr Asp Lys Glu Val Ile Lys Ser Asn Met Val Lys Gln
260 265 270
Leu Tyr Ser Pro Val Gln Phe Ile Asn Ser Thr Glu Trp Leu Ile Asp
275 280 285
Gln Gly Val Asp His Phe Ile Glu Ile Gly Pro Gly Lys Val Leu Ser
290 295 300
Gly Leu Ile Lys Lys Ile Asn Arg Asp Val Lys Leu Thr Ser Ile Gln
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Thr Leu Glu Asp Val Lys Gly Trp Asn Glu Asn Asp
325 330

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<212> PRT
<213> Staphylococcus aureus

<400> 3
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Ala Thr Glu Ile Leu Thr Ser Ala Ala Lys Thr Leu Asp Phe Asp Ile
35 40 45
Leu Glu Thr Met Phe Thr Asp Glu Glu Gly Lys Leu Gly Glu Thr Glu
50 55 60
Asn Thr Gln Pro Ala Leu Leu Thr His Ser Ser Ala Leu Leu Ala Ala
65 70 75 80
Leu Lys Ile Leu Asn Pro Asp Phe Thr Met Gly His Ser Leu Gly Glu
85 90 95
Tyr Ser Ser Leu Val Ala Ala Asp Val Leu Ser Phe Glu Asp Ala Val
100 105 110

Lys Ile Val Arg Lys Arg Gly Gln Leu Met Ala Gln Ala Phe Pro Thr
115 120 125
Gly Val Gly Ser Met Ala Ala Val Leu Gly Leu Asp Phe Asp Lys Val
130 135 140
Asp Glu Ile Cys Lys Ser Leu Ser Ser Asp Asp Lys Ile Ile Glu Pro
145 150 155 160
Ala Asn Ile Asn Cys Pro Gly Gln Ile Val Val Ser Gly His Lys Ala
165 170 175
Leu Ile Asp Glu Leu Val Glu Lys Gly Lys Ser Leu Gly Ala Lys Arg
180 185 190
Val Met Pro Leu Ala Val Ser Gly Pro Phe His Ser Ser Leu Met Lys
195 200 205
Val Ile Glu Glu Asp Phe Ser Ser Tyr Ile Asn Gln Phe Glu Trp Arg
210 215 220
Asp Ala Lys Phe Pro Val Val Gln Asn Val Asn Ala Gln Gly Glu Thr
225 230 235 240
Asp Lys Glu Val Ile Lys Ser Asn Met Val Lys Gln Leu Tyr Ser Pro
245 250 255
Val Gln Phe Ile Asn Ser Thr Glu Trp Leu Ile Asp Gln Gly Val Asp
260 265 270
His Phe Ile Glu Ile Gly Pro Gly Lys Val Leu Ser Gly Leu Ile Lys
275 280 285
Lys Ile Asn Arg Asp Val Lys Leu Thr Ser Ile Gln Thr Leu Glu Asp
290 295 300
Val Lys Gly Trp Asn Glu Asn Asp
305 310

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<211> 1001
<212> DNA
<213> Staphylococcus aureus

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tattttgagc aatttttaga tacatctgat gaatggatt ctaagatgac tggaattaaa 180
gaaagacatt gggcagatga cgatcaagat acttcagatt tagcatatga agcaagtgt 240
aaagcaatcg ctgacgctgg tattcagcct gaagatatac atatgataat tgttgccaca 300
gcaactggag atatgccatt tccaaactgtc gcaaatatgt tgcaagaacg ttttagggacg 360

ggcaaagttg cctctatgga tcaacttgca gcatgttctg gatttatgta ttcaatgatt 420
acagctaaac aatatgttca atctggagat tatacataata ttttagtgtt cggtgcagat 480
aaattatcta aaataaacaga tttaactgac cgttctactg cagttctatt tggagatggt 540
gcaggtgcgg ttatcatcggt tgaagttca gaaggcagag gtattataag ttatgaaatg 600
ggttctgatg gcactggtgg taaacattta tatttagata aagatactgg taaaactgaaa 660
atgaatggtc gagaagtatt taaatttgct gttagaatta tgggtgatgc atcaacacgt 720
gtagttgaaa aagcgaattt aacatcagat gatatagatt tatttattcc tcatacaagct 780
aatattagaa ttatggaatc agctagagaa cgcttaggta tttcaaaaga caaaatgagt 840
gtttctgtaa ataaatatgg aaatacttca gctgcgtcaa tacctttaag tatcgatcaa 900
gaattaaaaa atggtaaact caaagatgat gatacaattt ttcttgcgg attcgggtggc 960
ggcctaactt gggcgcaat gacaataaaa tggggaaaat a 1001

<210> 5

<211> 333

<212> PRT

<213> Staphylococcus aureus

<400> 5

Met Gly Ser Ser His His His His His Ser Ser Gly Leu Val Pro
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Arg Gly Ser His Met Asn Val Gly Ile Lys Gly Phe Gly Ala Tyr Ala
20 25 30

Pro Glu Lys Ile Ile Asp Asn Ala Tyr Phe Glu Gln Phe Leu Asp Thr
35 40 45

Ser Asp Glu Trp Ile Ser Lys Met Thr Gly Ile Lys Glu Arg His Trp
50 55 60

Ala Asp Asp Asp Gln Asp Thr Ser Asp Leu Ala Tyr Glu Ala Ser Val
65 70 75 80

Lys Ala Ile Ala Asp Ala Gly Ile Gln Pro Glu Asp Ile Asp Met Ile
85 90 95

Ile Val Ala Thr Ala Thr Gly Asp Met Pro Phe Pro Thr Val Ala Asn
100 105 110

Met Leu Gln Glu Arg Leu Gly Thr Gly Lys Val Ala Ser Met Asp Gln
115 120 125

Leu Ala Ala Cys Ser Gly Phe Met Tyr Ser Met Ile Thr Ala Lys Gln
130 135 140

Tyr Val Gln Ser Gly Asp Tyr His Asn Ile Leu Val Val Gly Ala Asp
145 150 155 160

Lys Leu Ser Lys Ile Thr Asp Leu Thr Asp Arg Ser Thr Ala Val Leu
165 170 175

Phe Gly Asp Gly Ala Gly Ala Val Ile Ile Gly Glu Val Ser Glu Gly
180 185 190
Arg Gly Ile Ile Ser Tyr Glu Met Gly Ser Asp Gly Thr Gly Gly Lys
195 200 205
His Leu Tyr Leu Asp Lys Asp Thr Gly Lys Leu Lys Met Asn Gly Arg
210 215 220
Glu Val Phe Lys Phe Ala Val Arg Ile Met Gly Asp Ala Ser Thr Arg
225 230 235 240
Val Val Glu Lys Ala Asn Leu Thr Ser Asp Asp Ile Asp Leu Phe Ile
245 250 255
Pro His Gln Ala Asn Ile Arg Ile Met Glu Ser Ala Arg Glu Arg Leu
260 265 270
Gly Ile Ser Lys Asp Lys Met Ser Val Ser Val Asn Lys Tyr Gly Asn
275 280 285
Thr Ser Ala Ala Ser Ile Pro Leu Ser Ile Asp Gln Glu Leu Lys Asn
290 295 300
Gly Lys Leu Lys Asp Asp Asp Thr Ile Val Leu Val Gly Phe Gly Gly
305 310 315 320
Gly Leu Thr Trp Gly Ala Met Thr Ile Lys Trp Gly Lys
325 330

<210> 6
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<212> PRT
<213> Staphylococcus aureus

<400> 6
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20 25 30
Asp Glu Trp Ile Ser Lys Met Thr Gly Ile Lys Glu Arg His Trp Ala
35 40 45
Asp Asp Asp Gln Asp Thr Ser Asp Leu Ala Glu Ala Ser Val Lys Ala
50 55 60
Ile Ala Asp Ala Gly Ile Gln Pro Glu Asp Ile Asp Met Ile Ile Val
65 70 75 80
Ala Thr Ala Thr Gly Asp Met Pro Phe Pro Thr Val Ala Asn Met Leu
85 90 95

Gln Glu Arg Leu Gly Thr Gly Lys Val Ala Ser Met Asp Gln Leu Ala
 100 105 110
 Ala Cys Ser Gly Phe Met Tyr Ser Met Ile Thr Ala Lys Gln Tyr Val
 115 120 125
 Gln Ser Gly Asp Tyr His Asn Ile Leu Val Val Gly Ala Asp Lys Leu
 130 135 140
 Ser Lys Ile Thr Asp Leu Thr Asp Arg Ser Thr Ala Val Leu Phe Gly
 145 150 155 160
 Asp Gly Ala Gly Ala Val Ile Ile Gly Glu Val Ser Glu Gly Arg Gly
 165 170 175
 Ile Ile Ser Tyr Glu Met Gly Ser Asp Gly Thr Gly Gly Lys His Leu
 180 185 190
 Tyr Leu Asp Lys Asp Thr Gly Lys Leu Lys Met Asn Gly Arg Glu Val
 195 200 205
 Phe Lys Phe Ala Val Arg Ile Met Gly Asp Ala Ser Thr Arg Val Val
 210 215 220
 Glu Lys Ala Asn Leu Thr Ser Asp Asp Ile Asp Leu Phe Ile Pro His
 225 230 235 240
 Gln Ala Asn Ile Arg Ile Met Glu Ser Ala Arg Glu Arg Leu Gly Ile
 245 250 255
 Ser Lys Asp Lys Met Ser Val Ser Val Asn Lys Tyr Gly Asn Thr Ser
 260 265 270
 Ala Ala Ser Ile Pro Leu Ser Ile Asp Gln Glu Leu Lys Asn Gly Lys
 275 280 285
 Leu Lys Asp Asp Asp Thr Ile Val Leu Val Gly Phe Gly Gly Leu
 290 295 300
 Thr Trp Gly Ala Met Thr Ile Lys Trp Gly Lys
 305 310 315

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 <212> DNA
 <213> Staphylococcus aureus

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 aaagctgaag cagtagtcga agaaatcaaa gctaaagggtg ttgacagttt tgcgattcaa 180
 gcaaatgttg ccgatgctga tgaagttaaa gcaatgatta aagaagtagt tagccaattt 240

ggttcttttag atgtcttagt aaataatgca ggtattactc gcgataattt attaatgcgt 300
atgaaagaac aagagtggga tgatgttatt gacacaaact taaaagggtgt atttaactgt 360
atccaaaaag caacaccaca aatgttaaga caacgttagt gtgctatcat caatttatca 420
agtgttggtg gagcagtagg taatccggga caagcaaact atgttgcac aaaagcaggt 480
gttattggtt taactaaatc tgcggcggtt gaattagcat ctcgtggat cactgtaaat 540
gcagttgcac ctgggttat tgtttctgat atgacagatg cttaagtga tgagcttaaa 600
gaacaaatgt tgactcgaat tccgttagca cgtttggc aagacacaga tattgcta 660
acagtagcgt tcttagcatc agacaaagca aaatatatta caggtcaaac aatccatgta 720
aatggtggaa tgtacatgta a 741

<210> 8

<211> 246

<212> PRT

<213> Staphylococcus aureus

<400> 8

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			20						25						30
Val	Asn	Tyr	Ala	Gly	Ser	Lys	Glu	Lys	Ala	Glu	Ala	Val	Val	Glu	Glu
									35						45
Ile	Lys	Ala	Lys	Gly	Val	Asp	Ser	Phe	Ala	Ile	Gln	Ala	Asn	Val	Ala
			50						55						60
Asp	Ala	Asp	Glu	Val	Lys	Ala	Met	Ile	Lys	Glu	Val	Val	Ser	Gln	Phe
			65						70						80
Gly	Ser	Leu	Asp	Val	Leu	Val	Asn	Asn	Ala	Gly	Ile	Thr	Arg	Asp	Asn
									85						95
Leu	Leu	Met	Arg	Met	Lys	Glu	Gln	Glu	Trp	Asp	Asp	Val	Ile	Asp	Thr
									100						110
Asn	Leu	Lys	Gly	Val	Phe	Asn	Cys	Ile	Gln	Lys	Ala	Thr	Pro	Gln	Met
									115						125
Leu	Arg	Gln	Arg	Ser	Gly	Ala	Ile	Ile	Asn	Leu	Ser	Ser	Val	Val	Gly
									130						140
Ala	Val	Gly	Asn	Pro	Gly	Gln	Ala	Asn	Tyr	Val	Ala	Thr	Lys	Ala	Gly
									145						160
Val	Ile	Gly	Leu	Thr	Lys	Ser	Ala	Ala	Arg	Glu	Leu	Ala	Ser	Arg	Gly
									165						175
Ile	Thr	Val	Asn	Ala	Val	Ala	Pro	Gly	Phe	Ile	Val	Ser	Asp	Met	Thr
									180						190

Asp Ala Leu Ser Asp Glu Leu Lys Glu Gln Met Leu Thr Arg Ile Pro
195 200 205
Leu Ala Arg Phe Gly Gln Asp Thr Asp Ile Ala Asn Thr Val Ala Phe
210 215 220
Leu Ala Ser Asp Lys Ala Lys Tyr Ile Thr Gly Gln Thr Ile His Val
225 230 235 240
Asn Gly Gly Met Tyr Met
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<210> 9
<211> 501
<212> DNA
<213> Staphylococcus aureus

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ttattaattt ataaagtatgt tgaatatgaa gaaggtcaac gttgtgtggc tattaaacaa 180
gtatcaggaa acgaaccatt cttaaaggc catttcctg agtatgcggt aatgccaggc 240
gtattaaatta ctgaagcggtt agctcaaaca ggtgcggtag ctatttaaa tagtgaagaa 300
aataaaaggta aaatcgctt atttgctggt attgataaat gtcgtttaa acgtcaagta 360
gtacctggtg atacttaaac gttgaaagta gaaatcacta aaattaaagg accaatcggt 420
aaaggtaatg ctaaagctac tgtcgatggt caacttgctt gtatgtga acttacattt 480
gcaattcaag atgtaaaata a 501

<210> 10
<211> 166
<212> PRT
<213> Staphylococcus aureus

<400> 10
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Arg Gly Ser His Met Glu Thr Ile Phe Asp Tyr Asn Gln Ile Lys Gln
20 25 30
Ile Ile Pro His Arg Gln Pro Phe Leu Leu Ile Asp Lys Val Val Glu
35 40 45
Tyr Glu Glu Gly Gln Arg Cys Val Ala Ile Lys Gln Val Ser Gly Asn
50 55 60

Glu Pro Phe Phe Gln Gly His Phe Pro Glu Tyr Ala Val Met Pro Gly
65 70 75 80
Val Leu Ile Thr Glu Ala Leu Ala Gln Thr Gly Ala Val Ala Ile Leu
85 90 95
Asn Ser Glu Glu Asn Lys Gly Lys Ile Ala Leu Phe Ala Gly Ile Asp
100 105 110
Lys Cys Arg Phe Lys Arg Gln Val Val Pro Gly Asp Thr Leu Thr Leu
115 120 125
Glu Val Glu Ile Thr Lys Ile Lys Gly Pro Ile Gly Lys Gly Asn Ala
130 135 140
Lys Ala Thr Val Asp Gly Gln Leu Ala Cys Ser Cys Glu Leu Thr Phe
145 150 155 160
Ala Ile Gln Asp Val Lys
165

<210> 11
<211> 774
<212> DNA
<213> Staphylococcus aureus

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cgtaaagaac gtagccgtaa agagcttgaa aaatttattag aacaattaaa tcaaccagaa 180
gcgcacttat atcaaattga tgttcaaaggc gatgaagagg ttattaatgg tttttagcaa 240
attggtaaag atgttggcaa tattgatggc gtatatcatt caatcgcat tgctaataatg 300
gaagacttac gcggacgcctt ttctgaaact tcacgtgaag gcttcttgc tt agctcaagac 360
attagttctt actcattaac aatttgtggct catgaagcta aaaaattaat gccagaaggt 420
ggtagcatttgc ttgcaacaac atatttaggt ggcgaattcg cagttcaaaa ttataatgtg 480
atgggtgttg cttaaagcgag cttagaagca aatgttaaat atttagcatt agacttaggt 540
cctgataata ttgcgtttaa tgcaatttca gctggtccaa tccgtacatt aagtgcacaaa 600
ggtgtgggtg gtttcaatac aattcttaaaa gaaatcgaag agcgtgcacc tttaaaacgt 660
aacgttgatc aagttagaagt aggtaaaaca gcggcttact trttaagtga cttatcaagt 720
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<210> 12
<211> 255
<212> PRT
<213> Staphylococcus aureus

<400> 12

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20 25 30
Gly Ala Lys Leu Val Phe Thr Tyr Arg Lys Glu Arg Ser Arg Lys Glu
35 40 45
Leu Glu Lys Leu Leu Glu Gln Leu Asn Gln Pro Glu Ala His Leu Tyr
50 55 60
Gln Ile Asp Val Gln Ser Asp Glu Glu Val Ile Asn Gly Phe Glu Gln
65 70 75 80
Ile Gly Lys Asp Val Gly Asn Ile Asp Gly Val Tyr His Ser Ile Ala
85 90 95
Phe Ala Asn Met Glu Asp Leu Arg Gly Arg Phe Ser Glu Thr Ser Arg
100 105 110
Glu Gly Phe Leu Leu Ala Gln Asp Ile Ser Ser Tyr Ser Leu Thr Ile
115 120 125
Val Ala His Glu Ala Lys Lys Leu Met Pro Glu Gly Gly Ser Ile Val
130 135 140
Ala Thr Thr Tyr Leu Gly Gly Glu Phe Ala Val Gln Asn Tyr Asn Val
145 150 155 160
Met Gly Val Ala Lys Ala Ser Leu Glu Ala Asn Val Lys Tyr Leu Ala
165 170 175
Leu Asp Leu Gly Pro Asp Asn Ile Arg Val Asn Ala Ile Ser Ala Gly
180 185 190
Pro Ile Arg Thr Leu Ser Ala Lys Gly Val Gly Gly Phe Asn Thr Ile
195 200 205
Leu Lys Glu Ile Glu Glu Arg Ala Pro Leu Lys Arg Asn Val Asp Gln
210 215 220
Val Glu Val Gly Lys Thr Ala Ala Tyr Leu Leu Ser Asp Leu Ser Ser
225 230 235 240
Gly Val Thr Gly Glu Asn Ile His Val Asp Ser Gly Phe His Ala
245 250 255

<210> 13

<211> 1245

<212> DNA

<213> Staphylococcus aureus

<400> 13
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cgtatcgata ctgaacctta tagcgttcac ttagcaggag aactaaaaa cttaatatt 180
gaagatcata tcgacaaaaa agaagcgcgt cgtatggata gatttactca atatgcaatt 240
gtagcagcta gagaggctgt taaagatgcg caattagata tcaatgataa tactgcagat 300
cgaatcggtg tatggattgg ttctggatc ggtggatgg aaacattga aattgcacat 360
aaacaattaa tggataaagg cccaagacgt gtgagtcac tttcgtacc aatgttaatt 420
cctgatatgg caactggca agtatcaatt gacttaggtg caaaaggacc aaatggtgca 480
acagttacag catgtgcaac aggtacaaac tcaatcggag aagcattaa aattgtgcaa 540
cgccgtgatg cagatgcaat gattacttgt ggtacggaag ctccaatcac tcataatggca 600
attgcaggtt tcagtgcag tcgagcgctt tctacaaatg atgacattga aacagcatgt 660
cgtccattcc aagaaggtag agacggttt gttatgggtg aaggtgctgg tattttagta 720
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tctagagcaa tgcaagcagc tatggatgat gctggattt aacctaaaga tgtacaatac 900
ttaaatgccc atggtacaag tactcctgtt ggtgacttaa atgaagttaa agctattaaa 960
aatacatttg gtgaagcagc taaacactta aaagtttagct caacaaaatc aatgactggt 1020
cacttacttg gtgcaacagg tggaattgaa gcaatcttct cagcgcttc aattaaagac 1080
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<210> 14

<211> 414

<212> PRT

<213> *Staphylococcus aureus*

<400> 14

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100 105 110
Met Glu Thr Phe Glu Ile Ala His Lys Gln Leu Met Asp Lys Gly Pro
115 120 125
Arg Arg Val Ser Pro Phe Phe Val Pro Met Leu Ile Pro Asp Met Ala
130 135 140
Thr Gly Gln Val Ser Ile Asp Leu Gly Ala Lys Gly Pro Asn Gly Ala
145 150 155 160
Thr Val Thr Ala Cys Ala Thr Gly Thr Asn Ser Ile Gly Glu Ala Phe
165 170 175
Lys Ile Val Gln Arg Gly Asp Ala Asp Ala Met Ile Thr Gly Gly Thr
180 185 190
Glu Ala Pro Ile Thr His Met Ala Ile Ala Gly Phe Ser Ala Ser Arg
195 200 205
Ala Leu Ser Thr Asn Asp Asp Ile Glu Thr Ala Cys Arg Pro Phe Gln
210 215 220
Glu Gly Arg Asp Gly Phe Val Met Gly Glu Gly Ala Gly Ile Leu Val
225 230 235 240
Ile Glu Ser Leu Glu Ser Ala Gln Ala Arg Gly Ala Asn Ile Tyr Ala
245 250 255
Glu Ile Val Gly Tyr Gly Thr Thr Gly Asp Ala Tyr His Ile Thr Ala
260 265 270
Pro Ala Pro Glu Gly Glu Gly Gly Ser Arg Ala Met Gln Ala Ala Met
275 280 285
Asp Asp Ala Gly Ile Glu Pro Lys Asp Val Gln Tyr Leu Asn Ala His
290 295 300
Gly Thr Ser Thr Pro Val Gly Asp Leu Asn Glu Val Lys Ala Ile Lys
305 310 315 320
Asn Thr Phe Gly Glu Ala Ala Lys His Leu Lys Val Ser Ser Thr Lys
325 330 335
Ser Met Thr Gly His Leu Leu Gly Ala Thr Gly Gly Ile Glu Ala Ile
340 345 350
Phe Ser Ala Leu Ser Ile Lys Asp Ser Lys Val Ala Pro Thr Ile His
355 360 365
Ala Val Thr Pro Asp Pro Glu Cys Asp Leu Asp Ile Val Pro Asn Glu
370 375 380
Ala Gln Asp Leu Asp Ile Thr Tyr Ala Met Ser Asn Ser Leu Gly Phe
385 390 395 400

Gly Gly His Asn Ala Val Leu Val Phe Lys Lys Phe Glu Ala
405 410

<210> 15
<211> 975
<212> DNA
<213> Streptococcus pneumoniae

<400> 15
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cgacaaaggc atattcaag aacagaatct accagtgatt tggctacaga ggttgctaag 180
aaactgatgg caaaagctgg aataaacagga aaagaactgg atttatcat cctagctacc 240
attactccag attcgatgat gccccttaca gctgctcgta ttcaagctaa tattggcgct 300
aataaaagcct ttgctttga cttaaccgcg gcttcagtg gatttgtatt tgctcttca 360
actgctgaaa agtttatcgc ttctggtcgc tttcaaaaag gcttggtgat tggtagtgaa 420
accctctcta aggcaagtcga ttggcggat cgatcaacag ctgtgttgg 480
gctgggtggtg tcttggtaga agctagcgag caagagcatt tcttagctga gagtcttaat 540
agcgatggaa gtcgcagcga gtgtttaact tatggcatt caggttgca ttctccattt 600
tcagatcaag aaagtgcaga ttcttttg aagatggatg gacgcacagt ctttgatttt 660
gccattcgag atgttagccaa gtctatcaag cagactattg atgaatctcc tatagaggtg 720
acagacttgg attatctgct acttcatcaa gccaatgacc gtattttgga taagatggct 780
agaaaaattt gtgttgaccg agccaaactt ccagccaata tggatggata tggcaataacc 840
agtgcagcca gtatcccgat ttactttca gagtgtgttag aacaaggct catccctta 900
gatggtagcc agactgttct tctatcaggc ttccggggag gcttgaccctg gggcacgctc 960
attcttacaa tttag 975

<210> 16
<211> 324
<212> PRT
<213> Streptococcus pneumoniae

<400> 16
Met Ala Phe Ala Lys Ile Ser Gln Val Ala His Tyr Val Pro Glu Gln
1 5 10 15
Val Val Thr Asn His Asp Leu Ala Gln Ile Met Asp Thr Asn Asp Glu
20 25 30
Trp Ile Ser Ser Arg Thr Gly Ile Arg Gln Arg His Ile Ser Arg Thr
35 40 45

Glu Ser Thr Ser Asp Leu Ala Thr Glu Val Ala Lys Lys Leu Met Ala
50 55 60
Lys Ala Gly Ile Thr Gly Lys Glu Leu Asp Phe Ile Ile Leu Ala Thr
65 70 75 80
Ile Thr Pro Asp Ser Met Met Pro Ser Thr Ala Ala Arg Val Gln Ala
85 90 95
Asn Ile Gly Ala Asn Lys Ala Phe Ala Phe Asp Leu Thr Ala Ala Cys
100 105 110
Ser Gly Phe Val Phe Ala Leu Ser Thr Ala Glu Lys Phe Ile Ala Ser
115 120 125
Gly Arg Phe Gln Lys Gly Leu Val Ile Gly Ser Glu Thr Leu Ser Lys
130 135 140
Ala Val Asp Trp Ser Asp Arg Ser Thr Ala Val Leu Phe Gly Asp Gly
145 150 155 160
Ala Gly Gly Val Leu Leu Glu Ala Ser Glu Gln Glu His Phe Leu Ala
165 170 175
Glu Ser Leu Asn Ser Asp Gly Ser Arg Ser Glu Cys Leu Thr Tyr Gly
180 185 190
His Ser Gly Leu His Ser Pro Phe Ser Asp Gln Glu Ser Ala Asp Ser
195 200 205
Phe Leu Lys Met Asp Gly Arg Thr Val Phe Asp Phe Ala Ile Arg Asp
210 215 220
Val Ala Lys Ser Ile Lys Gln Thr Ile Asp Glu Ser Pro Ile Glu Val
225 230 235 240
Thr Asp Leu Asp Tyr Leu Leu His Gln Ala Asn Asp Arg Ile Leu
245 250 255
Asp Lys Met Ala Arg Lys Ile Gly Val Asp Arg Ala Lys Leu Pro Ala
260 265 270
Asn Met Met Glu Tyr Gly Asn Thr Ser Ala Ala Ser Ile Pro Ile Leu
275 280 285
Leu Ser Glu Cys Val Glu Gln Gly Leu Ile Pro Leu Asp Gly Ser Gln
290 295 300
Thr Val Leu Leu Ser Gly Phe Gly Gly Leu Thr Trp Gly Thr Leu
305 310 315 320
Ile Leu Thr Ile

<210> 17

<211> 483

<212> DNA

<213> Streptococcus pneumoniae

<400> 17

atgggcagca gccatcatca tcatacatcac agcagcggcc tggtgccgct cggcagccat 60
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gaccgtgtct tggaagttag cgaggatacc attgttgcta tcaaaaatgt gaccatcaac 180
gagcctttct ttaacggcca ctttcctcaa tacccagtt tgccaggtgt tgtgattatg 240
gaagccttgg cgcaaactgc cggtgtgttg gagttatcaa aacctgaaaa taaagggaaaa 300
ctggtcttt acgctggat ggacaaggaa aagttcaaga agcaagttgt accaggcgac 360
caattggta tgacagcgac ttttgtaaaa cgtcgtggca ccatacgctgt gggtgaagca 420
aaggctgaag tggatggcaa gcttgcagcc agtggtagcc ttactttgc aattggaaac 480
taa 483

<210> 18

<211> 160

<212> PRT

<213> Streptococcus pneumoniae

<400> 18

Met Gly Ser Ser His His His His His Ser Ser Gly Leu Val Pro
1 5 10 15

Arg Gly Ser His Met Ile Asp Ile Gln Gly Ile Lys Glu Ala Leu Pro
20 25 30

His Arg Tyr Pro Met Leu Leu Val Asp Arg Val Leu Glu Val Ser Glu
35 40 45

Asp Thr Ile Val Ala Ile Lys Asn Val Thr Ile Asn Glu Pro Phe Phe
50 55 60

Asn Gly His Phe Pro Gln Tyr Pro Val Met Pro Gly Val Val Ile Met
65 70 75 80

Glu Ala Leu Ala Gln Thr Ala Gly Val Leu Glu Leu Ser Lys Pro Glu
85 90 95

Asn Lys Gly Lys Leu Val Phe Tyr Ala Gly Met Asp Lys Val Lys Phe
100 105 110

Lys Lys Gln Val Val Pro Gly Asp Gln Leu Val Met Thr Ala Thr Phe
115 120 125

Val Lys Arg Arg Gly Thr Ile Ala Val Val Glu Ala Lys Ala Glu Val
130 135 140

Asp Gly Lys Leu Ala Ala Ser Gly Thr Leu Thr Phe Ala Ile Gly Asn
145 150 155 160

<210> 19
<211> 1296
<212> DNA
<213> Streptococcus pneumoniae

<400> 19

atggcagca gccatcatca tcacatcac agcagcgccc tgggccgcg cggcagccat 60
atgaaactga atcgtgttgtt ggtaacaggat tatggagtaa catctccaat cgaaaataca 120
ccagaagaat tttggaaatag ttttagcaact gggaaaatcg gcattggtgg cattacaaaa 180
tttgatcata gtgactttga tgtgcataat gcggcagaaa tccaagattt tccgttcgat 240
aaatactttg taaaaaaaaa taccaaccgt tttgataact attctttata tgcccttgtat 300
gcagcccaag aggctgtaaa tcatgccaat cttgatgttag aggctcttaa tagggatcgt 360
tttggtgtta tcgttgcattc tggatttgtt ggaatcaagg aaattgaaga tcaggtactt 420
cgccatcgatg aaaaaggacc caaacgtgtc aaaccaatga ctcttccaaa agctttacca 480
aatatggctt ctggaaatgt agccatgcgt tttggtgcaa acggtgtttg taaatctatc 540
aatactgcct gctcttcattc aaatgatgcg attggggatg cttccgctc cattaagttt 600
ggtttccaag atgtgatgtt ggtgggagga acagaagctt ctatcacacc tttgccatc 660
gctggttcc aagccttaac agctctctct actacagagg atccaaactcg tgcttcgatc 720
ccatttgata aggatcgcaa tgggtttgtt atgggtgaag gttcaggat gttggttcta 780
gaaagtcttg aacacgctga aaaacgtgga gctactatcc tggctgaagt gttggttac 840
ggaaataactt gtgatgccta ccacatgact tctccacatc cagaaggatca gggagctatc 900
aaggccatca aactagcctt ggaagaagct gagattctc cagagcaagt agcctatgtc 960
aatgctcactg gaacgtcaac tcctgccaat gaaaaaggag aaagtggtgc tatcgtagct 1020
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gctgcgggtg cagtagaagc tatcgtcacc atcgaagcta tgcgtcataa ctttgtacca 1140
atgacagctg ggacaagtga agtatcagat tatatcgaag ctaatgtcgt ttatggacaa 1200
ggcttggaga aagaaattcc atacgctatt tcaaatactt ttgggtttgg aggccacaat 1260
gcagttcttg ctttcaaactg ttgggagaat cgttaa 1296

<210> 20
<211> 431
<212> PRT
<213> Streptococcus pneumoniae

<400> 20

Met	Gly	Ser	Ser	His	His	His	His	His	His	Ser	Ser	Gly	Leu	Val	Pro
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Arg Gly Ser His Met Lys Leu Asn Arg Val Val Val Thr Gly Tyr Gly
20 25 30
Val Thr Ser Pro Ile Gly Asn Thr Pro Glu Glu Phe Trp Asn Ser Leu
35 40 45
Ala Thr Gly Lys Ile Gly Ile Gly Gly Ile Thr Lys Phe Asp His Ser
50 55 60
Asp Phe Asp Val His Asn Ala Ala Glu Ile Gln Asp Phe Pro Phe Asp
65 70 75 80
Lys Tyr Phe Val Lys Lys Asp Thr Asn Arg Phe Asp Asn Tyr Ser Leu
85 90 95
Tyr Ala Leu Tyr Ala Ala Gln Glu Ala Val Asn His Ala Asn Leu Asp
100 105 110
Val Glu Ala Leu Asn Arg Asp Arg Phe Gly Val Ile Val Ala Ser Gly
115 120 125
Ile Gly Gly Ile Lys Glu Ile Glu Asp Gln Val Leu Arg Leu His Glu
130 135 140
Lys Gly Pro Lys Arg Val Lys Pro Met Thr Leu Pro Lys Ala Leu Pro
145 150 155 160
Asn Met Ala Ser Gly Asn Val Ala Met Arg Phe Gly Ala Asn Gly Val
165 170 175
Cys Lys Ser Ile Asn Thr Ala Cys Ser Ser Asn Asp Ala Ile Gly
180 185 190
Asp Ala Phe Arg Ser Ile Lys Phe Gly Phe Gln Asp Val Met Leu Val
195 200 205
Gly Gly Thr Glu Ala Ser Ile Thr Pro Phe Ala Ile Ala Gly Phe Gln
210 215 220
Ala Leu Thr Ala Leu Ser Thr Thr Glu Asp Pro Thr Arg Ala Ser Ile
225 230 235 240
Pro Phe Asp Lys Asp Arg Asn Gly Phe Val Met Gly Glu Gly Ser Gly
245 250 255
Met Leu Val Leu Glu Ser Leu Glu His Ala Glu Lys Arg Gly Ala Thr
260 265 270
Ile Leu Ala Glu Val Val Gly Tyr Gly Asn Thr Cys Asp Ala Tyr His
275 280 285
Met Thr Ser Pro His Pro Glu Gly Gln Gly Ala Ile Lys Ala Ile Lys
290 295 300
Leu Ala Leu Glu Glu Ala Glu Ile Ser Pro Glu Gln Val Ala Tyr Val
305 310 315 320
Asn Ala His Gly Thr Ser Thr Pro Ala Asn Glu Lys Gly Glu Ser Gly
325 330 335

Ala Ile Val Ala Val Leu Gly Lys Glu Val Pro Val Ser Ser Thr Lys
340 345 350
Ser Phe Thr Gly His Leu Leu Gly Ala Ala Gly Ala Val Glu Ala Ile
355 360 365
Val Thr Ile Glu Ala Met Arg His Asn Phe Val Pro Met Thr Ala Gly
370 375 380
Thr Ser Glu Val Ser Asp Tyr Ile Glu Ala Asn Val Val Tyr Gly Gln
385 390 395 400
Gly Leu Glu Lys Glu Ile Pro Tyr Ala Ile Ser Asn Thr Phe Gly Phe
405 410 415
Gly Gly His Asn Ala Val Leu Ala Phe Lys Arg Trp Glu Asn Arg
420 425 430

<210> 21

<211> 1273

<212> DNA

<213> Escherichia coli

<400> 21

tcgcgattga acaggcagtgc cagggcggtgc agcgacaagt tcctcagcga attgccgctc 60
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tgcggtagca ggacgctgcc agcgaactcg cagttgcaa gtgacggtat ataaccgaaa 180
agtgactgag cgtacatgta tacgaagatt attggtaactg gcagctatct gcccgaacaa 240
gtgcggacaa acgcccattt ggaaaaaatg gtggacacct ctgacgagtg gattgtcact 300
cgtaccggta tccgcgaacg ccacattgcc gcgcacaaacg aaaccgttcc aaccatggc 360
tttgaagcgg cgacacgcgc aattgagatg gcgggcattt agaaagacca gattggcctg 420
atcggttgtt caacgacttc tgctacgcac gcttcccga gcgcagcttgc ttagattcaa 480
agcatgttgg gcattaaagg ttgccccca tttgacgttg cagcagcctg cgcaggttcc 540
acctatgcat taagcgttagc cgatcaatac gtgaaatctg gggcggtgaa gtatgctctg 600
gtcgtcggtt ccgatgtact ggcgcgcacc tgcatccaa ccgatcggtt gactattatt 660
atttttggcg atggcgccgg cgctgcgggtt ctggctgcct ctgaagagcc gggatcatt 720
tccaccatc tgcatgccga cggtagttat ggtgaattgc tgacgctgcc aaacgcccac 780
cgcgtgaatc cagaatcc aattcatctg acgatggcgg gcaacgaagt cttcaagggtt 840
gcggtaacgg aactggcgca catcggttat gagacgctgg cggcgaataa tcttgaccgt 900
tctcaactgg actggcttgtt tccgcattcag gctaaccctgc gtattatcag tgcaacggcg 960
aaaaaaactcg gtatgtctat ggataatgtc gtggtgacgc tggatcgcca cggtaataacc 1020
tctgcggcct ctgtcccggtt cgcgcgtggat gaagctgtac gcgcacggcg cattaagccg 1080
gggcagttgg ttctgcttga agcctttggc ggtggattca cctggggctc cgcgcgtgg 1140
cgtttctagg ataaggatta aaacatgacg caatttgcattt tggacagggtt 1200

tctcaaaccg ttggaatgct ggctgatatg gcggcgagct atccaaattgt cgaagaaacg 1260
tttgctgaag ctt 1273

<210> 22

<211> 317

<212> PRT

<213> Escherichia coli

<400> 22

Met Tyr Thr Lys Ile Ile Gly Thr Gly Ser Tyr Leu Pro Glu Gln Val
1 5 10 15
Arg Thr Asn Ala Asp Leu Glu Lys Met Val Asp Thr Ser Asp Glu Trp
20 25 30
Ile Val Thr Arg Thr Gly Ile Arg Glu Arg His Ile Ala Ala Pro Asn
35 40 45
Glu Thr Val Ser Thr Met Gly Phe Glu Ala Ala Thr Arg Ala Ile Glu
50 55 60
Met Ala Gly Ile Glu Lys Asp Gln Ile Gly Leu Ile Val Val Ala Thr
65 70 75 80
Thr Ser Ala Thr His Ala Phe Pro Ser Ala Ala Cys Gln Ile Gln Ser
85 90 95
Met Leu Gly Ile Lys Gly Cys Pro Ala Phe Asp Val Ala Ala Cys
100 105 110
Ala Gly Phe Thr Tyr Ala Leu Ser Val Ala Asp Gln Tyr Val Lys Ser
115 120 125
Gly Ala Val Lys Tyr Ala Leu Val Val Gly Ser Asp Val Leu Ala Arg
130 135 140
Thr Cys Asp Pro Thr Asp Arg Gly Thr Ile Ile Phe Gly Asp Gly
145 150 155 160
Ala Gly Ala Ala Val Leu Ala Ala Ser Glu Glu Pro Gly Ile Ile Ser
165 170 175
Thr His Leu His Ala Asp Gly Ser Tyr Gly Glu Leu Leu Thr Leu Pro
180 185 190
Asn Ala Asp Arg Val Asn Pro Glu Asn Ser Ile His Leu Thr Met Ala
195 200 205
Gly Asn Glu Val Phe Lys Val Ala Val Thr Glu Leu Ala His Ile Val
210 215 220
Asp Glu Thr Leu Ala Ala Asn Asn Leu Asp Arg Ser Gln Leu Asp Trp
225 230 235 240

Leu Val Pro His Gln Ala Asn Leu Arg Ile Ile Ser Ala Thr Ala Lys
245 250 255
Lys Leu Gly Met Ser Met Asp Asn Val Val Val Thr Leu Asp Arg His
260 265 270
Gly Asn Thr Ser Ala Ala Ser Val Pro Cys Ala Leu Asp Glu Ala Val
275 280 285
Arg Asp Gly Arg Ile Lys Pro Gly Gln Leu Val Leu Leu Glu Ala Phe
290 295 300
Gly Gly Gly Phe Thr Trp Gly Ser Ala Leu Val Arg Phe
305 310 315

<210> 23

<211> 789

<212> DNA

<213> Escherichia coli

<400> 23

atgggttttc tttccggtaa gcgcattctg gtaaccggtg ttgccagcaa actatccatc 60
gcctacggta tcgctcaggc gatgcaccgc gaaggagctg aactggcatt cacctaccag 120
aacgacaaac tgaaaggccg cgtagaagaa tttgccgctc aattgggttc tgacatcggt 180
ctgcagtgcg atgttgcaga agatgccagc atcgacacca tggcgctga actggggaaa 240
gtttggccga aatttgacgg ttctgtacac tctattgggt ttgcacctgg cgatcagctg 300
gatggtgact atgttaacgc cggttacccgt gaaggcttca aaattgccc cgcacatcagc 360
tcctacagct tcgttgcaat ggcaaaagct tgccgctcca tgctgaatcc gggttctgcc 420
ctgctgaccc tttccttaccc tggcgctgag cgcgctatcc cgaactacaa cggttatgggt 480
ctggcaaaag cgtctctgga agcgaacgtg cgctatatgg cgaacgcgt gggccggaa 540
ggtgtgcgtg ttaacgccc ctctgctggc ccgatccgt ctctggcgcc ctccggatc 600
aaagacttcc gcaaaatgct ggctcattgc gaagccgtt ccccgattcg ccgtaccgtt 660
actattgaag atgtggtaa ctctgcccc ttcctgtgtt ccgatctctc tgccggatc 720
tccgggtgaag tggtccacgt tgacggcggt ttcagcattt ctgcaatgaa cgaactcgaa 780
ctgaaataa 789

<210> 24

<211> 262

<212> PRT

<213> Escherichia coli

<400> 24

Met Gly Phe Leu Ser Gly Lys Arg Ile Leu Val Thr Gly Val Ala Ser
1 5 10 15
Lys Leu Ser Ile Ala Tyr Gly Ile Ala Gln Ala Met His Arg Glu Gly
20 25 30
Ala Glu Leu Ala Phe Thr Tyr Gln Asn Asp Lys Leu Lys Gly Arg Val
35 40 45
Glu Glu Phe Ala Ala Gln Leu Gly Ser Asp Ile Val Leu Gln Cys Asp
50 55 60
Val Ala Glu Asp Ala Ser Ile Asp Thr Met Phe Ala Glu Leu Gly Lys
65 70 75 80
Val Trp Pro Lys Phe Asp Gly Phe Val His Ser Ile Gly Phe Ala Pro
85 90 95
Gly Asp Gln Leu Asp Gly Asp Tyr Val Asn Ala Val Thr Arg Glu Gly
100 105 110
Phe Lys Ile Ala His Asp Ile Ser Ser Tyr Ser Phe Val Ala Met Ala
115 120 125
Lys Ala Cys Arg Ser Met Leu Asn Pro Gly Ser Ala Leu Leu Thr Leu
130 135 140
Ser Tyr Leu Gly Ala Glu Arg Ala Ile Pro Asn Tyr Asn Val Met Gly
145 150 155 160
Leu Ala Lys Ala Ser Leu Glu Ala Asn Val Arg Tyr Met Ala Asn Ala
165 170 175
Met Gly Pro Glu Gly Val Arg Val Asn Ala Ile Ser Ala Gly Pro Ile
180 185 190
Arg Thr Leu Ala Ala Ser Gly Ile Lys Asp Phe Arg Lys Met Leu Ala
195 200 205
His Cys Glu Ala Val Thr Pro Ile Arg Arg Thr Val Thr Ile Glu Asp
210 215 220
Val Gly Asn Ser Ala Ala Phe Leu Cys Ser Asp Leu Ser Ala Gly Ile
225 230 235 240
Ser Gly Glu Val Val His Val Asp Gly Gly Phe Ser Ile Ala Ala Met
245 250 255
Asn Glu Leu Glu Leu Lys
260

<210> 25
<211> 234
<212> DNA
<213> Staphylococcus aureus

<400> 25

atggaaaatt tcgataaaagt aaaagatatc atcggtgacc gtttaggtgt agacgctgat 60
aaagtaactg aagatgcac tttcaaagat gatttaggcg ctgactcact tgatatcgct 120
gaatttagtaa tggaaattaga agacgagttt ggtactgaaa ttcctgatga agaagctgaa 180
aaaatcaaca ctgttggtga tgctgttaaa tttattaaca gtcttgaaaa ataa 234

<210> 26

<211> 77

<212> PRT

<213> *Staphylococcus aureus*

<400> 26

Met	Glu	Asn	Phe	Asp	Lys	Val	Lys	Asp	Ile	Ile	Val	Asp	Arg	Leu	Gly
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Val	Asp	Ala	Asp	Lys	Val	Thr	Glu	Asp	Ala	Ser	Phe	Lys	Asp	Asp	Leu
					20			25				30			
Gly	Ala	Asp	Ser	Leu	Asp	Ile	Ala	Glu	Leu	Val	Met	Glu	Leu	Glu	Asp
					35			40			45				
Glu	Phe	Gly	Thr	Glu	Ile	Pro	Asp	Glu	Glu	Ala	Glu	Lys	Ile	Asn	Thr
					50			55			60				
Val	Gly	Asp	Ala	Val	Lys	Phe	Ile	Asn	Ser	Leu	Glu	Lys			
					65			70			75				

<210> 27

<211> 234

<212> DNA

<213> *Streptococcus pneumoniae*

<400> 27

atgaaagaaa aagaaattt tgacagtatt gtgaccatta tccaaaggcg acagggagag 60
gactttgtcg tgacagaatc cttgagtctg aaagacgact tggatgctga ctcagttgat 120
ttgatggagt ttatcttgac gctggaggat gaatttagta tcgaaatcag cgatgaggaa 180
attgaccaac tccaaagtgt aggagatgtg gttaaaatca ttcaaggaaa atag 234

<210> 28

<211> 77

<212> PRT

<213> *Streptococcus pneumoniae*

<400> 28

Met Lys Glu Lys Glu Ile Phe Asp Ser Ile Val Thr Ile Ile Gln Glu
1 5 10 15
Arg Gln Gly Glu Asp Phe Val Val Thr Glu Ser Leu Ser Leu Lys Asp
20 25 30
Asp Leu Asp Ala Asp Ser Val Asp Leu Met Glu Phe Ile Leu Thr Leu
35 40 45
Glu Asp Glu Phe Ser Ile Glu Ile Ser Asp Glu Glu Ile Asp Gln Leu
50 55 60
Gln Ser Val Gly Asp Val Val Lys Ile Ile Gln Gly Lys
65 70 75

<210> 29

<211> 225

<212> DNA

<213> Streptococcus pneumoniae

<400> 29

atggcagtat ttgaaaaagt acaagaaatt atcggtgaag aacttggaaa agacgcata 60
gaagtaaacac ttgaatcaac ttttgatgat ttggacgcag attcattgga cttgttccaa 120
gtaatctcag aaatcgaaga tgctttgat atccaaatcg aagcagaaaa tgacttgaaa 180
acagttggtg acttgggtgc ttacgttcaa gagcaagcaa aataa 225

<210> 30

<211> 74

<212> PRT

<213> Streptococcus pneumoniae

<400> 30

Met Ala Val Phe Glu Lys Val Gln Glu Ile Ile Val Glu Glu Leu Gly
1 5 10 15
Lys Asp Ala Ser Glu Val Thr Leu Glu Ser Thr Phe Asp Asp Leu Asp
20 25 30
Ala Asp Ser Leu Asp Leu Phe Gln Val Ile Ser Glu Ile Glu Asp Ala
35 40 45
Phe Asp Ile Gln Ile Glu Ala Glu Asn Asp Leu Lys Thr Val Gly Asp
50 55 60

Leu Val Ala Tyr Val Glu Glu Gln Ala Lys

65

70

<210> 31

<211> 951

<212> DNA

<213> Haemophilus influenzae

<400> 31

atgaatagta gaattttatc caccggtagc tatctgccga gccatattcg cacaaatgcg 60
gatttagaaa aaatggttga tacatcagat gaatggattt tcactcggtc tggtatccgt 120
gaacgtcgta tcgcagcggaa agatgaaact gttcaaca tgggatttga agcggcaaaa 180
aatgcgatcg aagctgctca aattaatcct caagatattt aactgattat tgttgcaact 240
acaagtcaact cacatgctta tccaagtgcg gcttgccaa tgcaagggtt attaaatatt 300
gatgatgcga tttcttttga tttagccgca gcttgcacag gctttgtcta tgcttgagc 360
gtagctgatc aatttatttcg tgcaggcaaa gtaaaaaaag ctttagtgat aggctcagat 420
ctcaattctc gtaaattaga tgaaacagat cgcaagcactg ttgtgctatt tggtgatggt 480
gcgggtgctg taattttaga agcgagtgaa caagaaggaa ttatctccac ccatttacac 540
gcttcagcaa ataaaaataa tgcccttgtt tttagtcagc cagaacgtgg tatagaaaaa 600
tctggctata tcgagatgca aggtAACGAA acgttcaat tggcagttcg tgaactttca 660
aatgttagtgg aggaaacact tttagccaaat aatttagata aaaaagattt agactggctt 720
gtgccacacc aagcaaattt acgttattt acagcgacag ctaaaaaatt agaaatggat 780
atgtcgcaag tggtggttaac gttagataaa tacgctaata acagtgcagc aacagtgcct 840
gtcgctttag atgaggctgt tcgagatggc cgtattcaac gtggcagtt actattatta 900
gaagcctttg gcgggtgggtt gacttgggt tcagcgtag tgagattta g 951

<210> 32

<211> 316

<212> PRT

<213> Haemophilus influenzae

<400> 32

Met Asn Ser Arg Ile Leu Ser Thr Gly Ser Tyr Leu Pro Ser His Ile

1

5

10

15

Arg Thr Asn Ala Asp Leu Glu Lys Met Val Asp Thr Ser Asp Glu Trp

20

25

30

Ile Val Thr Arg Ser Gly Ile Arg Glu Arg Arg Ile Ala Ala Glu Asp

35

40

45

Glu Thr Val Ala Thr Met Gly Phe Glu Ala Ala Lys Asn Ala Ile Glu
50 55 60
Ala Ala Gln Ile Asn Pro Gln Asp Ile Glu Leu Ile Ile Val Ala Thr
65 70 75 80
Thr Ser His Ser His Ala Tyr Pro Ser Ala Ala Cys Gln Val Gln Gly
85 90 95
Leu Leu Asn Ile Asp Asp Ala Ile Ser Phe Asp Leu Ala Ala Ala Cys
100 105 110
Thr Gly Phe Val Tyr Ala Leu Ser Val Ala Asp Gln Phe Ile Arg Ala
115 120 125
Gly Lys Val Lys Lys Ala Leu Val Ile Gly Ser Asp Leu Asn Ser Arg
130 135 140
Lys Leu Asp Glu Thr Asp Arg Ser Thr Val Val Leu Phe Gly Asp Gly
145 150 155 160
Ala Gly Ala Val Ile Leu Glu Ala Ser Glu Gln Glu Gly Ile Ile Ser
165 170 175
Thr His Leu His Ala Ser Ala Asn Lys Asn Asn Ala Leu Val Leu Ala
180 185 190
Gln Pro Glu Arg Gly Ile Glu Lys Ser Gly Tyr Ile Glu Met Gln Gly
195 200 205
Asn Glu Thr Phe Lys Leu Ala Val Arg Glu Leu Ser Asn Val Val Glu
210 215 220
Glu Thr Leu Ser Ala Asn Asn Leu Asp Lys Lys Asp Leu Asp Trp Leu
225 230 235 240
Val Pro His Gln Ala Asn Leu Arg Ile Ile Thr Ala Thr Ala Lys Lys
245 250 255
Leu Glu Met Asp Met Ser Gln Val Val Val Thr Leu Asp Lys Tyr Ala
260 265 270
Asn Asn Ser Ala Ala Thr Val Pro Val Ala Leu Asp Glu Ala Val Arg
275 280 285
Asp Gly Arg Ile Gln Arg Gly Gln Leu Leu Leu Leu Glu Ala Phe Gly
290 295 300
Gly Gly Trp Thr Trp Gly Ser Ala Leu Val Arg Phe
305 310 315

<210> 33

<211> 233

<212> DNA

<213> Escherichia coli

<400> 33
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gaagaagtta ccaacaatgc ttcttcgtt gaagacctgg gcgcggattc tcttgacacc 120
gtttagctgg taatggctct ggagaagagt ttgatactga gattccggac gaagaagctg 180
agaaaatcac caccgttcag gctgccattg attacatcaa cgccaccag gcg 233

<210> 34

<211> 78

<212> PRT

<213> Escherichia coli

<400> 34

Met	Ser	Thr	Ile	Glu	Glu	Arg	Val	Lys	Lys	Ile	Ile	Gly	Glu	Gln	Leu
1			5					10				15			
Gly	Val	Lys	Gln	Glu	Glu	Val	Thr	Asn	Asn	Ala	Ser	Phe	Val	Glu	Asp
							20				25			30	
Leu	Gly	Ala	Asp	Ser	Leu	Asp	Thr	Val	Glu	Leu	Val	Met	Ala	Leu	Glu
							35				40			45	
Glu	Glu	Phe	Asp	Thr	Glu	Ile	Pro	Asp	Glu	Glu	Ala	Glu	Lys	Ile	Thr
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<210> 37
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<213> Streptococcus pneumoniae

<400> 37

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						20			25					30	
Ser	Lys	Ala	Gly	Gly	Leu	Gly	Ile	Ile	Gly	Gly	Asn	Ala	Pro	Lys	
							35		40				45		
Glu	Val	Val	Lys	Ala	Asn	Ile	Asp	Lys	Ile	Lys	Ser	Leu	Thr	Asp	Lys
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Pro	Phe	Gly	Val	Asn	Ile	Met	Leu	Leu	Ser	Pro	Phe	Val	Glu	Asp	Ile
						65		70			75			80	
Val	Asp	Leu	Val	Ile	Glu	Glu	Gly	Val	Lys	Val	Val	Thr	Thr	Gly	Ala
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Gly	Asn	Pro	Ser	Lys	Tyr	Met	Glu	Arg	Phe	His	Glu	Ala	Gly	Ile	Ile
						100			105			110			
Val	Ile	Pro	Val	Val	Pro	Ser	Val	Ala	Leu	Ala	Lys	Arg	Met	Glu	Lys
						115			120			125			
Ile	Gly	Ala	Asp	Ala	Val	Ile	Ala	Glu	Gly	Met	Glu	Ala	Gly	Gly	His
						130		135			140				
Ile	Gly	Lys	Leu	Thr	Thr	Met	Thr	Leu	Val	Arg	Gln	Val	Ala	Thr	Ala
						145		150			155			160	
Ile	Ser	Ile	Pro	Val	Ile	Ala	Ala	Gly	Gly	Ile	Ala	Asp	Gly	Glu	Gly
						165			170			175			
Ala	Ala	Ala	Gly	Phe	Met	Leu	Gly	Ala	Glu	Ala	Val	Gln	Val	Gly	Thr
						180			185			190			
Arg	Phe	Val	Val	Ala	Lys	Glu	Ser	Asn	Ala	His	Pro	Asn	Tyr	Lys	Glu
						195			200			205			
Lys	Ile	Leu	Lys	Ala	Arg	Asp	Ile	Asp	Thr	Thr	Ile	Ser	Ala	Gln	His
						210			215			220			
Phe	Gly	His	Ala	Val	Arg	Ala	Ile	Lys	Asn	Gln	Leu	Thr	Arg	Asp	Phe
						225			230			235			240
Glu	Leu	Ala	Glu	Lys	Asp	Ala	Phe	Lys	Gln	Glu	Asp	Pro	Asp	Leu	Glu
						245			250			255			

Ile Phe Glu Gln Met Gly Ala Gly Ala Leu Ala Lys Ala Val Val His
260 265 270
Gly Asp Val Asp Gly Gly Ser Val Met Ala Gly Gln Ile Ala Gly Leu
275 280 285
Val Ser Lys Glu Glu Thr Ala Glu Glu Ile Leu Lys Asp Leu Tyr Tyr
290 295 300
Gly Ala Ala Lys Lys Ile Gln Glu Glu Ala Ser Arg Trp Ala Gly Val
305 310 315 320
Val Arg Asn Asp

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